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Heat-associated Injuries, US Army, 1990-2001

There are three critical determinants of heat-associated injury risk: environmental conditions (temperature and humidity); intensity of physical activity; and individual characteristics (e.g., hydration status, physical fitness, underlying health). Heat-associated injuries are a significant threat to military populations because of frequent occupational exposures to strenuous physical activities in hot and humid environments.

The most serious heat-associated injury is heat stroke. Heat stroke is the state of extreme hyperthermia that occurs when the body's ability to dissipate heat is overwhelmed. Heat stroke signs and symptoms include headache, weakness, loss of consciousness, hot dry skin, high body temperature, rapid pulse, and multi-organ system failure. Heat stroke can be fatal without immediate and definitive medical intervention. Other heat-associated injuries include heat exhaustion and heat cramps which result from excessive fluid and electrolyte depletion.

Because heat injuries are preventable, it is useful to identify factors associated with increased risk. Previous summaries reported in the MSMR have identified correlates of risk of heat-associated injury among servicemembers including summer season[1-2], younger age[1,3-4], female gender[1-4], recent enrollment in the military[1], and enlisted rank[2-3]. Two MSMR reports documented higher rates among Hispanic personnel[3-4], while a third noted higher rates among Asian and Native American soldiers[2].

Methods. For this report, the surveillance period was 1 January 1990 through 31 December 2001. All records of hospitalizations, ambulatory visits (starting in 1996), and reportable medical events (beginning in 1994) with International Classification of Disease codes indicative of heat-related injuries (ICD-9-CM codes: 992.0–992.9) were identified from the Defense Medical Surveillance System. Incident events were defined as the first diagnosis of a heat-related injury per individual in a calendar year. Second events in the same calendar year were also included if they occurred 28 days or more after a previous diagnosis. The effects of demographic characteristics on the diagnosis of a heat-related injury were examined using a case-control design. Cases diagnosed between 1998 and 2001 were included. Two noncases were randomly selected per case as a referent group. Controls were randomly selected from all non-cases as of 31 December 2001.

Results. Between 1990 and 2001, there were 7,311 incident heat-related diagnoses among US Army soldiers. The overall rate during the period was 1.1 per 1,000 person years.

In 2001, there were more outpatient diagnoses and more reportable medical event reports of heat-associated injuries than in any other year of the surveillance period. In addition, there were more hospitalized cases of heat injuries in 2001 than in any year since 1992 (figure 1). Overall, the rate of heat injuries during 2001 was 3.5 per 1000 person years, the highest annual rate of the surveillance period.

Because of differences in case ascertainment over time, further summaries were done in two time periods: 1990-1997 and 1998-2001 (table 1). During the earlier period, most cases were ascertained from hospitalization records, while during the later period, cases were derived from all data sources. As expected, there were significantly fewer cases per year from 1990 to 1997 compared to 1998 to 2001 (figure 1).

During both periods, cases were most frequently young, junior, and male (table 1). For example, in both time periods, approximately 80% of affected soldiers were males (table 1). At the time of diagnosis, approximately 30% of cases had a length of service of one year or less. The most common diagnosis in both periods was heat exhaustion, followed by "other" diagnoses and heat stroke. The most striking difference between the periods was the higher proportion of hospitalized cases in the earlier (68.0%) compared to the later (13.3%) period. As expected, more than 80% of all cases occurred between May and September with a peak in July (figure 2).

Results of the case-control analysis, which was limited to the years 1998-2001, are presented in table 2. In the adjusted model, there was an inverse dose-response relationship between age and risk of a heat-related diagnosis. Soldiers younger than 20

Figure 1. Number of heat-related injuries, by source of report and year of diagnosis, US Army, 1990-2001.

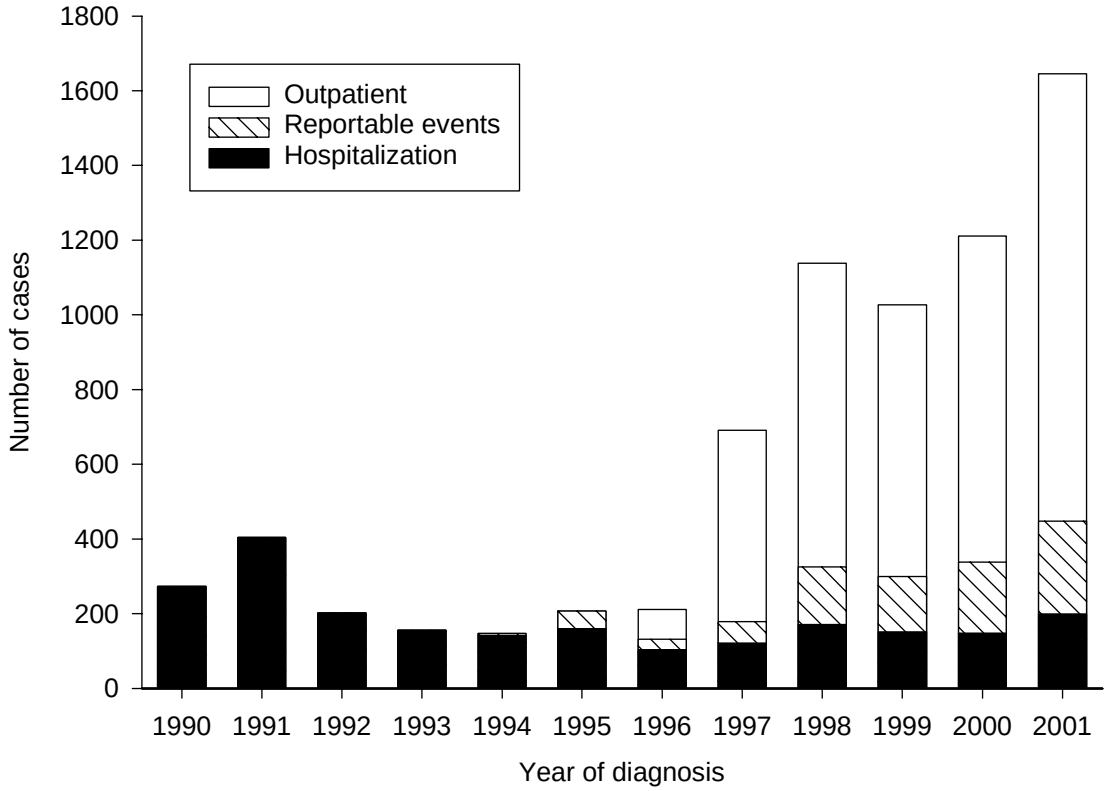
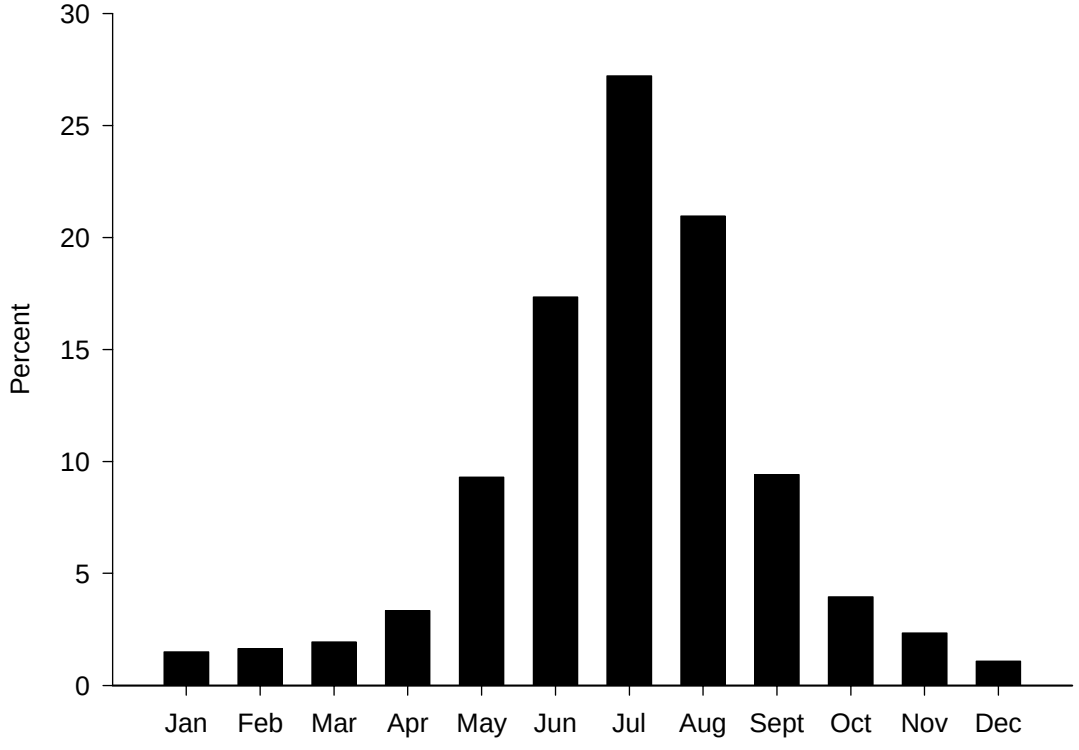


Figure 2. Distribution of heat-related cases, by month of diagnosis, US Army, 1990-2001.



years had a 2.1-times increased risk compared to those over 40 years of age. Other factors significantly associated with heat injury risk were female gender, lower levels of education, combat-related military occupation, and enlisted military status.

An inverse dose-response relationship was also observed for years of military service and risk of heat injury. Personnel with less than 1 year of military service were 2.3-times more likely to be diagnosed with a heat-related injury compared to those with more than or equal to 4 years of service (table 2). In general, cases were more likely to have less than 4 years of service, while controls were more likely to have more than or equal to 10 years of service (figure 3).

Compared to their White and Black nonhispanic counterparts (who had comparable risks), soldiers of "other" racial/ethnic subgroups had slightly increased risk while Hispanic soldiers had slightly decreased risk of heat injury. Home of record prior to service was not a strong independent correlate of heat injury risk: soldiers from the Southeast had the relatively highest risk of heat injury, while those from the West had the relatively lowest risk (table 2).

Editorial Comment. Military populations must often conduct intense and prolonged physical activities in hot and humid environments. Such activities are potentially dangerous. At particular risk are initial entry trainees who may conduct intense outdoor training in heat stressful environments before they are physically conditioned and/or acclimatized to the heat. Fortunately, heat injuries are preventable.

In this report, we identified several characteristics of soldiers that are associated with heat injury risk. In particular, younger, female, junior (less than four years of service), enlisted soldiers—especially those in combat occupations—have higher risks of heat injury than their counterparts. It is likely that these factors are surrogates for durations of exposures to and intensities of physical activities in heat stressful conditions. Other factors, such as race-ethnicity, home of record, and marital status were not strong independent correlates of heat injury risk.

In this summary, there was a sudden increase in heat injury cases beginning in 1997. This increase was attributable to the addition of outpatient and reportable event data to the Defense Medical Surveillance System. Still, in 2001, heat injury rates overall were higher than in any other year of the surveillance period—and there were more hospitalized cases in 2001 than in any year since 1992. The reasons for the relatively high rates of heat injuries in 2001 are not clear. At least some heat injury cases in recent years may reflect more aggressive management of heat injuries earlier in their clinical courses and/or improved ascertainment and reporting of cases through standardized reporting systems.

The findings of this summary indicate that all soldiers should be informed of the adverse effects of heat and of prescribed countermeasures; and that commanders and supervisors at all levels should ensure compliance with prescribed prevention measures. The Office of the Surgeon General, US Army, has recently disseminated heat injury prevention guidelines[5] including the following:

First, determine the wet bulb globe temperature and the heat category (1 through 5, with 5=highest risk) each hour in the immediate vicinity of the activity site.

Second, enforce appropriate water intake and work/rest cycles for the measured heat category.

Third, modify the intensity of activities and the duty uniform to decrease heat injury risk (e.g., loosen or remove heavy clothing; intermittently wear soft caps rather than Kevlar helmets; limit unnecessary strenuous exercise).

Fourth, plan carefully for events involving sequential days of high performance training (e.g., air assault, expert infantry badge, and expert field medical badge courses). Many heat injuries occur in conjunction with such activities. Allow for adequate train-up conditioning, and provide adequate time for fluid replenishment, rest, and recovery.

Fifth, dehydration can worsen over several days of heat exposure; also, heat stress accumulates during sequential days of strenuous activities. In turn, fluid intakes should be increased during multi-day periods of strenuous activities. Also, soldiers should be well hydrated on nights prior to strenuous activities in the heat.

Sixth, allow time for soldiers to adjust to the heat. Gradually increasing work in the heat allows for safe adaptation to hot climates. Acclimatization increases water requirements, and full acclimatization can take up to 2 weeks.

Seventh, soldiers recovering from injuries or illnesses, and those who are otherwise in poor physical

condition, are particularly susceptible to heat injuries.

Eighth, soldiers should eat regular meals to replace salt. When regular meals are eaten, salt tablets are unnecessary.

Ninth, certain dietary supplements (especially ephedra) and medications (some cold and allergy remedies) can increase heat injury risk. Also, alcohol consumption can lead to dehydration and increased risk of heat injury.

The following guidelines[5] relate to the early detection and management of heat injury cases. First, when heat injuries are suspected, affected soldiers should be immediately treated with oral fluids and body cooling. Affected soldiers should be encouraged to drink water (not to exceed 1.5 quarts per hour). If affected soldiers cannot drink, they should be treated with intravenous fluids, if available, and evacuated immediately. Second, body cooling can be accomplished by removal of outer clothing, fanning, spraying, or partial immersion in cool water. Hydration and cooling should be continued for not more than 20 minutes before the response is evaluated. Finally, distinguishing between symptoms of minor heat injury and life-threatening heat stroke can be difficult. Severe heat injury, including heat stroke, usually causes disorientation, confusion, dizziness, collapse, or loss of consciousness. If any symptoms suggestive of heat stroke persist for more than a few minutes, the casualty should be immediately evacuated for definitive medical evaluation and treatment.

Additional information regarding heat injury prevention is available from the US Army Center for

Table 1. Heat-associated injuries, US Army, 1990-2001

	1990-1997		1998-2001	
	N	%	N	%
Total	2,290	100.0	5,021	100.0
Age				
<20 years	356	15.6	903	18.0
20-29 years	1,507	65.8	3,162	63.0
30-39 years	367	16.0	834	16.6
>=40 years	59	2.6	122	2.4
Gender				
Male	1,970	86.0	3,982	79.3
Female	320	14.0	1,039	20.7
Length of service				
0.0 to 0.9 years	671	29.3	1,522	30.3
1.0 to 1.9 years	364	15.9	849	16.9
2.0 to 2.9 years	234	10.2	590	11.8
3.0 to 3.9 years	179	7.8	376	7.5
>=4 years	842	36.8	1,684	33.5
Heat-related diagnoses				
Heat stroke	406	17.7	706	14.1
Heat exhaustion	1,424	62.2	2,774	55.3
Other	460	20.1	1,541	30.7
Resulted in hospitalization	1,558	68.0	669	13.3
Number of heat-related diagnoses per person*				
1	2,164	97.4	4,342	93.9
2	54	2.4	203	4.4
>2	5	0.2	78	1.7

* Diagnoses occurring at least 28 days after a prior diagnosis were considered incident injuries.

Health Promotion and Prevention Medicine (http://chppm-www.apgea.army.mil/heat/), the US Army Safety Center (http://safety.army.mil), and the US Army Institute of Environmental Medicine (commercial telephone: 508-233-4811).

Analysis and report by Michael Silverberg, PhD, MPH, Army Medical Surveillance Activity

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Figure 3. Distribution of years of military service among heat injury cases, 1998-2001, and controls, US Army.

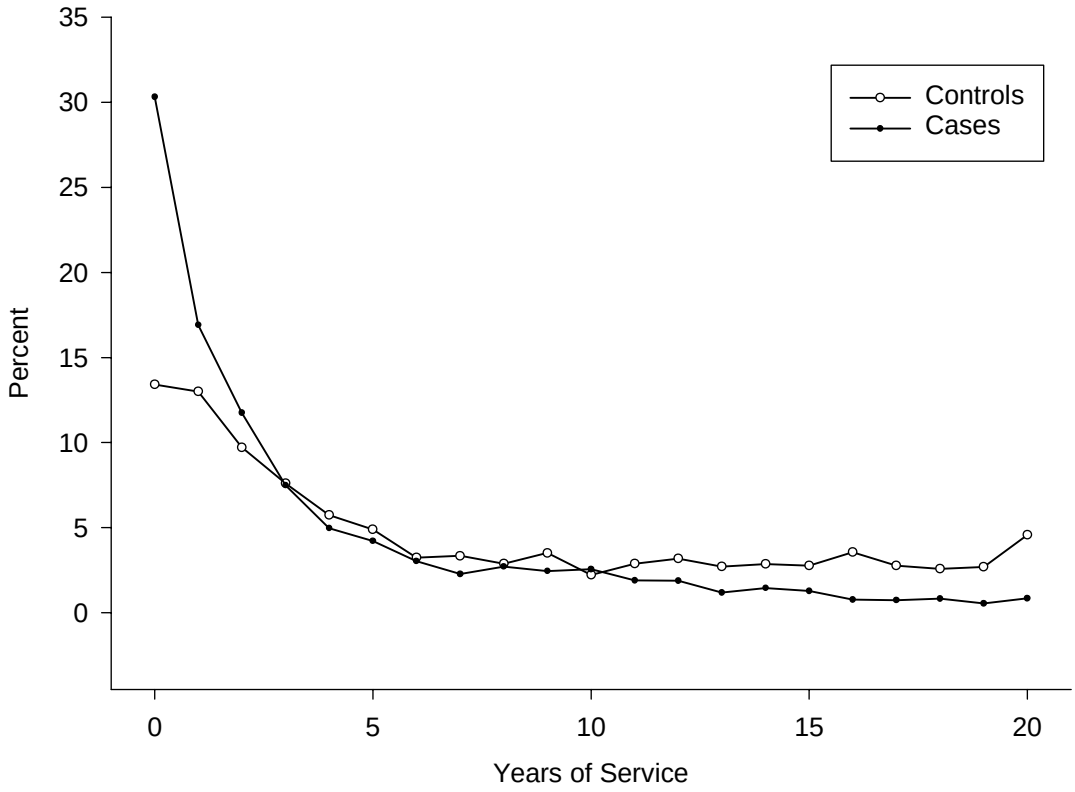


Table 2. Heat-associated injuries, crude and adjusted odds ratios in relation to demographic and military characteristics of soldiers, US Army, 1998-2001

	Cases		Controls		Crude		Adjusted	
	N	%	N	%	OR	95% CI	OR	95% CI
Total	5,021	100.0	10,042	100.0				
Age								
<20 years	903	18.0	902	9.0	7.7	(6.3, 9.5)	2.1	(1.4, 3.1)
20-29 years	3,162	63.0	5,227	52.1	4.7	(3.8, 5.7)	1.9	(1.3, 2.7)
30-39 years	834	16.6	2,971	29.6	2.2	(1.8, 2.7)	1.2	(0.8, 1.7)
>=40 years	122	2.4	942	9.4	1.0		1.0	
Gender								
Female	1,039	20.7	1,525	15.2	1.5	(1.3, 1.6)	1.5	(1.4, 1.7)
Male	3,982	79.3	8,517	84.8	1.0		1.0	
Education								
High school or less	4,077	85.0	7,478	75.7	5.6	(4.3, 7.2)	2.0	(1.2, 3.1)
Some college or degree	657	13.7	1,748	17.7	3.8	(2.9. 5.0)	2.0	(1.2, 3.1)
Some post-graduate	64	1.3	652	6.6	1.0		1.0	
Marital status								
Single, never married	2,928	58.4	4,294	42.9	1.9	(1.7, 2.0)	0.9	(0.9, 1.0)
Married or Other	2,086	41.6	5,722	57.1	1.0		1.0	
Race/ethnicity								
Black	1,341	26.7	2,630	26.2	1.0	(0.9, 1.1)	1.0	(0.9, 1.1)
Hispanic	367	7.3	880	8.8	0.8	(0.7, 0.9)	0.7	(0.6, 0.8)
Other	354	7.1	681	6.8	1.0	(0.9, 1.2)	1.2	(1.0, 1.4)
White	2,958	58.9	5,848	58.3	1.0		1.0	
Occupation								
Combat	1,651	33.6	2,764	28.1	1.3	(1.2, 1.4)	1.5	(1.4, 1.6)
Medical	403	8.2	844	8.6	1.0	(0.9, 1.2)	1.2	(1.1, 1.4)
Non-combat/medical	2,861	58.2	6,213	63.3	1.0		1.0	
Home of Record (U.S. only)								
West	764	16.4	1,402	17.6	0.9	(0.8, 1.0)	0.8	(0.7, 0.9)
Midwest	862	18.5	1,502	18.9	0.9	(0.8, 1.0)	0.9	(0.8, 1.0)
Southwest	619	13.3	1,107	13.9	0.9	(0.8, 1.0)	0.9	(0.8, 1.0)
Northeast	784	16.9	1,371	17.2	0.9	(0.8, 1.0)	0.9	(0.8, 1.0)
Southeast	1,622	34.9	2,586	32.5	1.0		1.0	
Military rank								
Enlisted	4,603	91.7	8,410	83.8	2.1	(1.9, 2.4)	1.3	(1.0, 1.7)
Officer	418	8.3	1,632	16.3	1.0		1.0	
Length of service								
0.0 to 0.9 years	1,522	30.3	1,399	13.9	3.6	(3.3, 4.0)	2.3	(2.0, 2.6)
1.0 to 1.9 years	849	16.9	1,318	13.1	2.1	(1.9, 2.4)	1.4	(1.3, 1.6)
2.0 to 2.9 years	590	11.8	1,015	10.1	1.9	(1.7, 2.2)	1.4	(1.2, 1.6)
3.0 to 3.9 years	376	7.5	712	7.1	1.8	(1.5, 2.0)	1.2	(1.0, 1.4)
>=4 years	1,684	33.5	5,598	55.8	1.0		1.0	

Hematuria among Active Duty Members, US Armed Forces, 1999-2000

Hematuria, the macroscopic or microscopic presence of red blood cells in the urine, is a common clinical finding among adults. Hematuria can be associated with severe underlying conditions such as neoplasms of the kidney or bladder and chronic progressive kidney diseases. However, blood in the urine may also result from minor and/or self-limited conditions such as urinary tract infections and kidney stones.[1-4] Clinical evaluations of hematuria can be stressful, costly, and time consuming; and as a result, physicians may be reluctant to conduct costly and invasive diagnostic evaluations of patients with hematuria of unknown cause.[1-4] Insights regarding the epidemiology and clinical significance of hematuria in a generally healthy young adult population such as the U.S. Armed Forces may be useful in counseling, evaluating, and following the courses of young adults with hematuria.

For this report, we calculated incidence rates of hematuria in demographic subgroups of active-duty servicemembers during calendar year 1999. We then compared the ambulatory visit experiences of servicemembers with hematuria (during the year prior to and after the diagnosis of hematuria) and a matched comparison group.

Methods. All data were derived from the Defense Medical Surveillance System. The surveillance population included all persons who served on active duty in the US Armed Forces during calendar year 1999. A hematuria case was defined as an active duty servicemember who received at least one diagnosis of hematuria (ICD-9-CM: 599.7) in 1999.

Only the earliest ambulatory diagnosis of hematuria per case was used for incidence rate calculations. Incidence rates were calculated by dividing the number of incident ambulatory visits for hematuria by the sum of person-years at risk in 1999. Incidence rates were calculated overall and in sex, race/ethnicity (Black, White, Hispanic, Other), and age (17-29, 30-39, 40-49, >49 years)-defined subgroups.

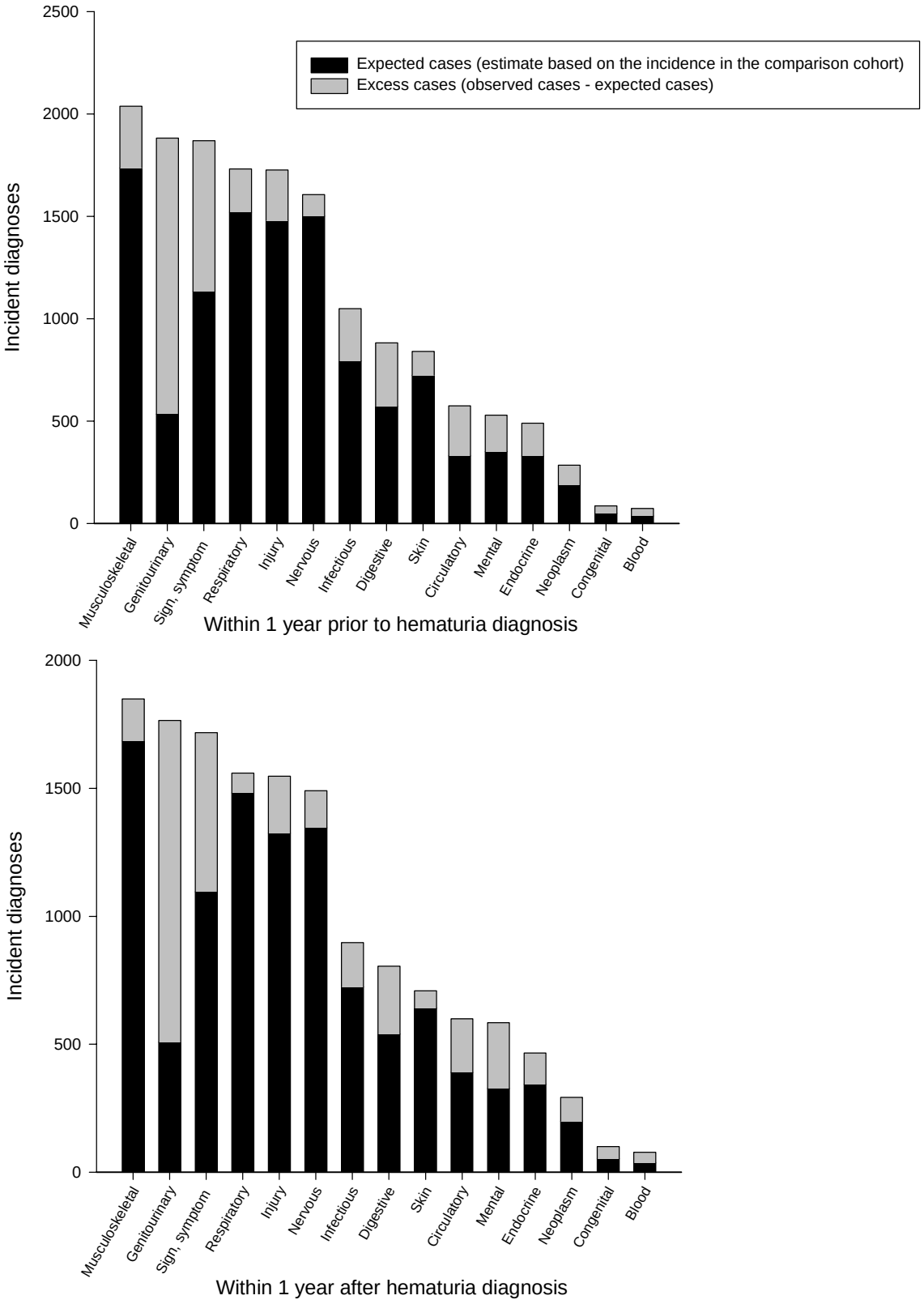
All cases were included in the hematuria case cohort. All individuals who did not have an ambulatory visit for hematuria during 1999 ("non-cases") were eligible for inclusion in a comparison cohort. Specifically, for each case, four individuals were randomly selected from among all non-cases who matched the case on date of birth (+/- 365 days), race (Black, White, Hispanic, Asian, American Indian, and Other), and sex.

For each major diagnostic category specified in the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) (excluding V-codes, conditions of the perinatal period, complications of pregnancy and childbirth, and hematuria), incidence rates of ambulatory visits were calculated for the one-year preceding and one-year following the hematuria diagnosis for the case cohort and the comparison cohort. Rate ratios were calculated by dividing the incidence rates of ambulatory visits in the hematuria case cohort by the corresponding incidence rates in the comparison cohort. Excess incident diagnoses in the case cohort were estimated as the differences between the observed and expected numbers of incident diagnoses in the case cohort. Expected numbers of incident diagnoses in the case cohort were estimated by multiplying the incidence rate in the comparison cohort by the person-years at risk of the case cohort.

Results. During 1999, 5,166 active duty servicemembers received at least one diagnosis of hematuria. The crude incidence rate was 3.8 per 1,000 person-years. Women had a higher incidence rate than men, and black non-hispanic servicemembers had a higher rate than white and hispanic/other servicemembers. Overall, incidence rates of hematuria increased with age (table 1).

During the year prior to the hematuria diagnosis, incident rates of ambulatory visits were higher in the case cohort than the comparison cohort for every major diagnostic category (table 2). Incident rates in the case cohort were highest for diseases of the musculoskeletal system (46.6 /1,000), diseases of the genitourinary system (43.0/1,000), and symptoms, signs, and ill-defined conditions (42.7/1,000). The comparison cohort had the highest incidence rates for diseases of the musculoskeletal system (39.7/1,000), diseases of the respiratory system (34.7/1,000), and

Figure 1. Incident diagnoses in hematuria case cohort, prior to and after hematuria diagnosis, by major diagnostic category, US Armed Forces, 1999-2000.



diseases of the nervous system (34.3/1,000). Diseases of the genitourinary system were the ninth most common category in the comparison cohort versus the second most common in the case cohort. Case-to-comparison incidence rate ratios (IRR) exceeded 1.5 for five major diagnostic categories: diseases of the genitourinary system (IRR: 3.5), blood disorders (IRR: 2.1), diseases of the circulatory system (IRR: 1.7), congenital anomalies (IRR: 1.7), and symptoms, signs, and ill-defined conditions (IRR: 1.6).

In the year after hematuria diagnoses, incident ambulatory diagnoses were generally similar to those the year before hematuria diagnoses (table 2). Incident rates in the case cohort were highest for diseases of the musculoskeletal system (47.2/1,000), diseases of the genitourinary system (45.0/1,000), and symptoms, signs, and ill-defined conditions (43.8/1,000). Like the pre-diagnosis year, there were eight diagnostic categories with more ambulatory visits than diseases of genitourinary system in the comparison cohort. Case-to-comparison incidence rate ratios exceeded 1.5 for the same five diagnostic categories as in the pre-diagnosis year: genitourinary disorders (IRR: 3.5); diseases of blood and blood-forming organs (IRR: 2.2); diseases of the circulatory system (IRR: 1.8); congenital anomalies (IRR: 1.9); and symptoms, signs, and ill-defined conditions (IRR: 1.6).

During the years before and after hematuria diagnoses in cases, there were an estimated 4,390 and 3,767 excess incident diagnoses, respectively, among cases relative to non-cases (figure 1). The most excess incident diagnoses among cases were for "diseases of the genitourinary system" (total excess incident diagnoses: 2,606) and "signs, symptoms, and ill-defined conditions" (total excess incident diagnoses: 1,359). Together, these two categories accounted for nearly 50% of the total excess incident diagnoses in the years before and after hematuria diagnoses. In contrast, blood disorders, congenital anomalies, and circulatory disorders—categories with relatively high incident rate ratios in both the pre- and post-diagnosis periods—together accounted for only 8% of all excess incident diagnoses.

Within the major category of "diseases of the genitourinary system," the sub-category with the highest case-to-comparison incidence rate ratio was "nephritis, nephrotic syndrome, and nephrosis" (ICD-9-CM codes: 580-589) (IRR pre-diagnosis: 11.7; IRR post-diagnosis: 20.2). This group of relatively uncommon disorders accounted for 63 and 97 excess incident diagnoses during the pre- and post-hematuria diagnostic periods, respectively. The sub-category of genitourinary disorders that accounted for the most excess incident diagnoses was "other diseases of the urinary system" (ICD-9-CM codes: 590-599) which includes cystitis, renal stones, and other relatively common conditions. This sub-category accounted for 1,086 and 986 excess incident diagnoses during the pre- and post-hematuria diagnosis periods, respectively (table 2).

Finally, within the category, "signs, symptoms, and ill-defined conditions," the sub-category that accounted for the most excess incident diagnoses during the pre- (n= 426) and post- (n=291) hematuria diagnosis periods was "other symptoms involving the abdomen and pelvis" (ICD-9-CM code: 789) which includes abdominal pain, tenderness, rigidity, ascites, hepatomegaly, and splenomegaly (table 2).

Editorial comment. In 1999, 5,166 servicemembers (nearly 0.4% of the US Armed Forces) were diagnosed with hematuria during ambulatory visits. Published estimates of hematuria prevalences in diverse populations and settings have ranged from 0.2% to 21.1%.[2,3] Thus, the cumulative incidence of hematuria documented in this study is at the low end of the range of prior estimates. This is not surprising considering that, compared to general civilian populations, military servicemembers over represent young adult males. In addition, during pre-induction and periodic medical examinations, illnesses associated with hematuria may be identified that preclude entrance to or continuation of military service.

In this study, the strongest demographic correlate of hematuria risk was age. This finding is consistent with findings in nonmilitary populations; in fact, some studies have reported mean ages of cases greater than 50 years.[4]

Comparisons of the ambulatory visit experiences of a hematuria and a comparison cohort over a two-year period provide insights into causes and correlates of hematuria in generally healthy young adults. Not surprisingly, the highest relative rates and the most excess incident diagnoses in the case cohort were for diseases of the genitourinary system. Among diseases of the genitourinary system, the largest relative increases in rates were for nephritis, nephrotic syndrome, and nephrosis. Other diagnoses that had

higher rates among hematuria cases than non-cases were congenital anomalies of the urinary system, coagulation defects, and malignant neoplasms of the genitourinary organs. However, despite the elevated rates of these conditions among cases, they were still relatively infrequently diagnosed because the background rates are very low.

On the other hand, there were diagnoses with only moderately elevated rates among cases compared to noncases, but large excesses of incident diagnoses. These included "diseases of the urinary system" (e.g., cystitis, pyelonephritis, renal stones), "symptoms involving the abdomen and pelvis," "symptoms of the urinary system," and "diseases of male genital organs."

Finally, incidence rates were higher in every diagnostic category among hematuria cases compared to a comparison cohort. Because of the consistency and magnitudes of the increased rates across all categories, it seems unlikely that the entire difference was related to hematuria or chance. Although the hematuria and comparison cohorts were matched on gender, age, and race, it seems likely that there were other confounding differences between the cohorts. Because hematuria can accompany many underlying conditions, and because cases (but not controls) required a diagnosis in an ambulatory setting, it is possible that the hematuria case group had more frequently occurring or more severe medical problems and/or better access to ambulatory clinics than the comparison group. In summary, servicemembers who were diagnosed with hematuria were more likely than others—but still very unlikely—to have severe underlying medical conditions.

Analysis and report by Gabriella Andreotii, MPH, Analysis Group, Army Medical Surveillance Activity.

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Table 1. Incidence rates of hematuria, active duty, US Armed Forces, 1999

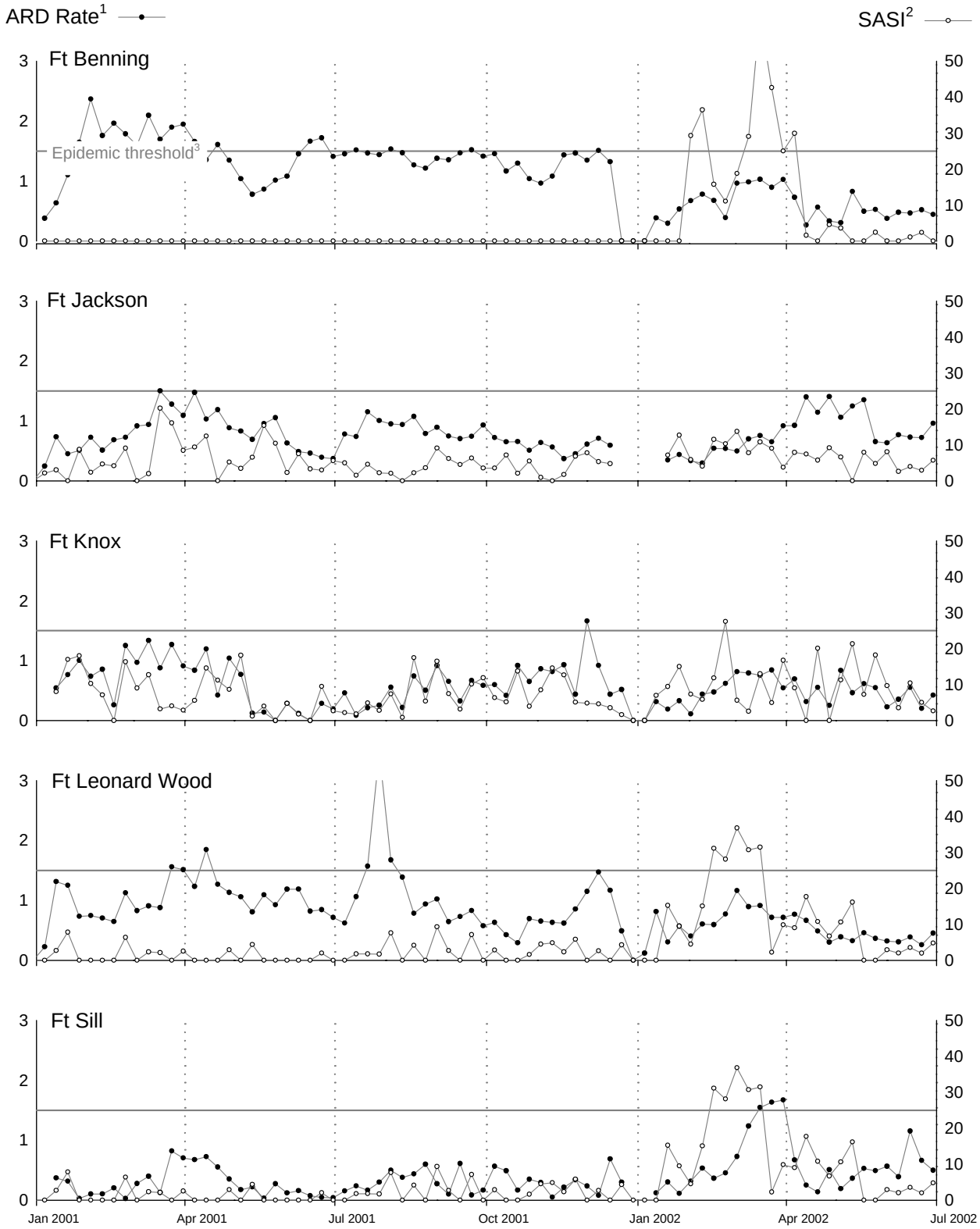
	Cases	Person-years	Rate/1,000
Total	5,167	1,359,004	3.8
Gender			
Female	859	192,732	4.5
Male	4,308	1,166,272	3.7
Race/ethnicity			
Black	1,336	272,438	4.9
Hispanic	371	98,841	3.8
Other	347	88,063	3.9
White	3,113	899,662	3.5
Age group			
17-29 years	2,448	812,461	3.0
30-39 years	1,689	417,663	4.0
40-49 years	912	119,354	7.6
50-65 years	118	9,526	12.4

Table 2. Incidence rates of ambulatory visits, by diagnositc categories (and selected subcategories), year prior to and year after hematuria diagnosis in case cohort, US Armed Forces

	Year prior to hematuira diagnosis					Year after hematuria diagnosis				
Diagnostic category (ICD-9-CM)	**Case rate**	**Control rate**	**Rate ratio**	**Rate difference**	**Excess cases***	**Case rate**	**Control rate**	**Rate ratio**	**Rate difference**	**Excess cases***
Infectious and parasitic (001- 139)	24.0	18.1	1.3	5.8	256	22.9	18.5	1.2	4.4	173
Neoplasms (140 - 239)	6.5	4.3	1.5	2.2	98	7.5	5.1	1.5	2.4	94
Malignant neoplams of genitourinary organs (179-189)	0.9	0.2	4.4	0.7	32	1.7	0.2	7.0	1.5	57
Endocrine, nutritional, metabolic, imuunity (240 - 279)	11.2	7.5	1.5	3.7	162	11.9	8.7	1.4	3.1	123
Blood and blood-forming organs (280 - 289)	1.7	0.8	2.1	0.9	37	2.0	0.9	2.2	1.1	42
Coagulation defects (286)	0.1	0.0	9.7	0.1	5	0.2	0.1	3.1	0.1	5
Mental disorders (290 - 319)	12.1	8.0	1.5	4.1	179	15.3	10.0	1.5	5.3	209
Nervous system and sense organs (320 - 389)	36.7	34.3	1.1	2.4	105	39.8	37.8	1.1	2.0	77
Circulatory system (390 - 459)	13.1	7.5	1.7	5.6	245	14.9	8.4	1.8	6.6	257
Respiratory system (460- 519)	39.6	34.7	1.1	4.8	211	39.5	33.8	1.2	5.7	223
Digestive system (520 - 579)	20.2	13.1	1.5	7.1	310	20.5	13.8	1.5	6.8	265
Genitourinary system (580 - 629 [excluding 599.7: hematuria])	43.0	12.2	3.5	30.8	1,349	45.0	13.0	3.5	32.1	1,257
Nephritis, nephrotic syndrome, nephrosis (580-589)	1.6	0.1	11.7	1.4	63	2.6	0.1	20.2	2.5	97
Other diseases of the urinary system (590-599)	29.3	4.5	6.6	24.8	1,086	29.4	4.3	6.9	25.2	986
Diseases of male genital organs (600-608)	11.5	2.9	3.9	8.6	377	14.7	3.0	4.9	11.7	459
Skin and subcutaneous tissue (680 - 709)	19.2	16.5	1.2	2.7	117	18.1	16.4	1.1	1.7	68
Musculoskelatal and connective tissue (710 - 739)	46.6	39.7	1.2	6.9	301	47.2	43.0	1.1	4.2	164
Congenital anomalies (740 - 759)	2.0	1.1	1.7	0.8	37	2.6	1.4	1.9	1.2	47
Congenital anomalies of urinary system (753)	0.6	0.0	16.2	0.5	23	0.9	0.1	12.8	0.8	37
Symptoms, signs, and ill-defined conditions (780 - 799)	42.7	25.9	1.6	16.8	736	43.8	27.9	1.6	15.9	623
Symptoms involving urinary system (788)	5.5	0.7	8.3	4.8	212	5.8	0.9	6.9	5.0	196
Other symptoms involving abdomen and pelvis (789)	14.6	4.8	3.0	9.7	426	13.1	5.6	2.3	7.4	291
Nonspecific findings on examination of urine (791)	1.4	0.1	14.1	1.3	57	1.6	0.1	20.1	1.5	59
Injury and poisoning (800 - 999)	39.4	33.8	1.2	5.6	247	38.0	34.4	1.1	3.7	145

* Estimated excess cases in case cohort relative to control cohort

Acute respiratory disease (ARD) and streptococcal pharyngitis (SASI), Army Basic Training Centers by week through June 29, 2002



[1]ARD rate = cases per 100 trainees per week

[2]SASI (Strep ARD surveillance index) = (ARD rate)x(rate of Group A beta-hemolytic strep)

[3]ARD rate >=1.5 or SASI >=25.0 for 2 consecutive weeks indicates an "epidemic"

Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through June 30, 2001 and 2002

Reporting location	Number of reports all events[3]		Food-borne								Vaccine Preventable					
			Campylo-bacter		Giardia		Salmonella		Shigella		Hepatitis A		Hepatitis B		Varicella	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
NORTH ATLANTIC																
Washington, DC Area	55	60	-	2	1	1	1	-	2	4	-	-	-	-	1	-
Aberdeen, MD	19	18	-	-	-	-	-	-	-	-	-	-	-	1	-	-
FT Belvoir, VA	36	31	5	4	2	-	-	2	-	-	-	-	-	-	-	-
FT Bragg, NC	573	815	1	2	-	-	-	1	1	1	-	-	-	1	2	-
FT Drum, NY	102	34	1	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Eustis, VA	88	83	-	1	-	-	1	-	-	-	-	-	-	1	1	1
FT Knox, KY	97	88	-	1	1	1	1	1	-	-	-	-	-	-	1	-
FT Lee, VA	100	102	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Meade, MD	23	33	-	-	-	-	-	-	-	-	-	-	-	-	-	1
West Point, NY	14	16	1	-	-	-	1	-	-	-	2	-	-	-	-	-
GREAT PLAINS																
FT Sam Houston, TX	112	115	-	-	1	-	-	-	-	-	-	-	-	-	-	-
FT Bliss, TX	70	50	1	-	2	1	-	-	-	1	-	-	-	2	1	-
FT Carson, CO	266	215	-	2	-	-	-	-	-	-	-	-	1	1	-	-
FT Hood, TX	685	807	1	-	-	-	-	2	-	-	-	-	5	-	2	-
FT Huachuca, AZ	13	22	1	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Leavenworth, KS	9	13	-	-	-	-	1	-	-	-	-	-	-	-	-	-
FT Leonard Wood, MO	94	101	-	-	-	-	-	1	-	-	-	-	-	-	5	2
FT Polk, LA	102	82	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FT Riley, KS	72	124	-	-	-	-	-	-	-	-	-	-	-	-	-	1
FT Sill, OK	137	107	-	1	-	-	-	-	-	-	-	-	1	-	1	-
SOUTHEAST																
FT Gordon, GA	75	54	-	-	-	-	-	-	-	-	1	-	1	-	-	-
FT Benning, GA	144	154	1	-	1	1	1	2	-	-	-	-	-	-	3	-
FT Campbell, KY	283	270	2	1	2	-	1	1	-	-	-	-	-	-	-	1
FT Jackson, SC	111	131	-	-	-	-	-	-	-	-	-	-	5	-	2	1
FT Rucker, AL	27	33	-	1	-	-	-	-	-	-	-	-	-	-	-	-
FT Stewart, GA	202	250	-	-	-	1	-	-	-	1	-	-	1	-	-	1
WESTERN																
FT Lewis, WA	289	314	2	-	-	-	2	1	-	-	-	-	1	-	-	-
FT Irwin, CA	21	18	-	-	-	-	-	-	-	-	2	-	1	-	2	-
FT Wainwright, AK	34	45	-	1	-	-	-	-	-	-	-	-	-	-	-	-
OTHER LOCATIONS																
Hawaii	244	243	12	10	5	2	3	4	2	-	-	-	1	1	-	-
Europe	575	865	14	15	-	-	12	4	-	-	2	1	4	5	6	5
Korea	31	213	-	-	-	-	1	1	-	-	-	-	-	-	2	1
Total	**4,703**	**5,506**	**42**	**41**	**15**	**7**	**25**	**20**	**5**	**7**	**7**	**1**	**21**	**12**	**29**	**14**

1. Includes active duty servicemembers, dependents, and retirees.

2. Events reported by July 7, 2001 and 2002.

3. Seventy events specified by Tri-Service Reportable Events, Version 1.0, July 2000.

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

(Cont'd) Sentinel reportable events for all beneficiaries[1] at US Army medical facilities, cumulative numbers[2] for calendar years through June 30, 2001 and 2002

Reporting location	Arthropod-borne				Sexually Transmitted								Environmental			
	Lyme Disease		Malaria		Chlamydia		Gonorrhea		Syphilis[3]		Urethritis[4]		Cold		Heat	
	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002
NORTH ATLANTIC																
Washington, DC Area	1	1	-	-	28	31	6	8	5	3	-	-	1	1	-	1
Aberdeen, MD	-	-	-	-	12	16	5	1	-	-	-	-	-	-	-	-
FT Belvoir, VA	-	2	-	-	20	15	5	5	-	1	-	-	-	2	-	-
FT Bragg, NC	-	-	2	1	224	557	141	111	-	-	138	76	-	-	3	1
FT Drum, NY	-	-	-	-	79	22	19	12	1	-	-	-	-	-	-	-
FT Eustis, VA	-	-	-	-	56	64	28	14	-	-	-	-	-	1	-	-
FT Knox, KY	-	-	-	-	75	65	17	16	2	-	-	-	-	-	-	-
FT Lee, VA	-	-	-	-	70	86	30	15	-	-	-	-	-	1	-	-
FT Meade, MD	-	-	-	-	17	28	6	2	-	-	-	2	-	-	-	-
West Point, NY	2	1	-	-	6	5	-	3	-	-	-	-	3	1	-	-
GREAT PLAINS																
FT Sam Houston, TX	-	-	-	-	91	91	8	16	-	-	1	-	-	-	-	-
FT Bliss, TX	1	-	1	-	45	32	15	6	-	1	-	-	1	-	1	-
FT Carson, CO	-	-	-	-	193	150	29	25	-	-	42	31	-	-	-	-
FT Hood, TX	-	-	-	1	347	426	142	194	2	2	165	159	-	-	-	1
FT Huachuca, AZ	-	-	-	-	12	17	-	4	-	-	-	-	-	-	-	-
FT Leavenworth, KS	-	-	-	-	5	10	1	3	-	-	-	-	-	-	-	-
FT Leonard Wood, MO	-	-	-	-	53	70	19	18	-	-	5	2	-	-	-	1
FT Polk, LA	-	-	-	-	77	53	22	25	-	2	-	-	-	-	-	-
FT Riley, KS	-	-	-	-	55	86	11	25	-	-	-	-	-	-	-	-
FT Sill, OK	-	-	-	-	71	65	29	15	-	-	31	23	1	-	-	-
SOUTHEAST																
FT Gordon, GA	-	-	-	-	62	43	5	8	-	-	-	-	-	-	-	-
FT Benning, GA	-	-	-	-	74	65	25	47	-	1	1	-	-	-	-	-
FT Campbell, KY	-	-	-	-	221	216	53	43	1	1	-	-	2	-	-	-
FT Jackson, SC	-	-	-	-	67	102	31	24	2	1	-	-	-	-	-	-
FT Rucker, AL	-	-	-	-	23	22	1	10	-	-	-	-	-	-	-	-
FT Stewart, GA	-	1	-	-	50	147	55	73	-	1	89	-	-	1	-	-
WESTERN																
FT Lewis, WA	-	-	-	1	168	218	43	31	-	2	68	58	-	-	-	1
FT Irwin, CA	-	-	-	-	10	11	2	7	-	-	-	-	-	-	-	-
FT Wainwright, AK	-	1	-	-	24	26	-	3	-	-	-	-	-	1	-	-
OTHER LOCATIONS																
Hawaii	-	-	-	1	185	179	26	35	-	-	1	-	-	-	-	2
Europe	1	-	-	1	441	615	83	200	1	3	-	3	1	-	-	1
Korea	-	-	1	2	4	158	14	46	1	-	1	1	-	-	4	2
Total	**5**	**6**	**4**	**7**	**2,865**	**3,691**	**871**	**1,045**	**15**	**18**	**542**	**355**	**9**	**8**	**8**	**10**

3. Primary and secondary.

4. Urethritis, non-gonococcal (NGU).

Note: Completeness and timeliness of reporting vary by facility.

Source: Army Reportable Medical Events System.

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